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IOT Based Gas Detection System

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ABSTRACT: This gas detection system utilizes Internet of Things(IOT) to create the smart and efficient gas detection solution. It aims to safe the people by quickly finding and sending the SMS to alert about the harmful gases. Its a smart system that watches for harmful situations, warns us early, and helps prevent accidents, making places and activities much safer for everyone. It involves deploying sensors that can detect the presence of gases in the environment. These sensors are connected to a central system through the internet, allowing real-time monitoring and analysis. This not only detect but also warn us by sending the SMS and alarm which is installed in the circuit.

KEYWORDS: IOT, Sensor, Gas Detection,SMS, Thingspeak Cloud.

I. INTRODUCTION

In recent years, the integration of the Internet of Things (IoT) technology has revolutionized the way we approach safety and monitoring systems. One such innovative application is the IoT-based gas detection system, designed to enhance our ability to detect and respond to hazardous gas situations effectively. This system combines traditional gas detection methods with IoT connectivity, creating a smart and proactive approach to safeguarding lives and property. The system provides the flexibility of remote monitoring, enabling users to oversee gas levels from virtually anywhere. This not only improves the efficiency of gas detection but also facilitates timely decision-making and intervention. This interconnected approach allows for real-time analysis of gas levels and immediate response in the event of anomalies. The system first detects the gas through use of MQ2 gas sensor and sends this data to Thingspeak Cloud. ThingSpeak is an IoT (Internet of Things) platform that enables users to collect, analyze, and visualize data from their connected devices.

Paper is organized as follows. Section II review and discuss the existing literature, studies, and technologies that are relevant to the IoT-based gas detection system. Section III outlines the approach, techniques, and procedures used to design, implement, and evaluate the IoT-based gas detection system. Section IV shows the output and received SMS after detection of gas.

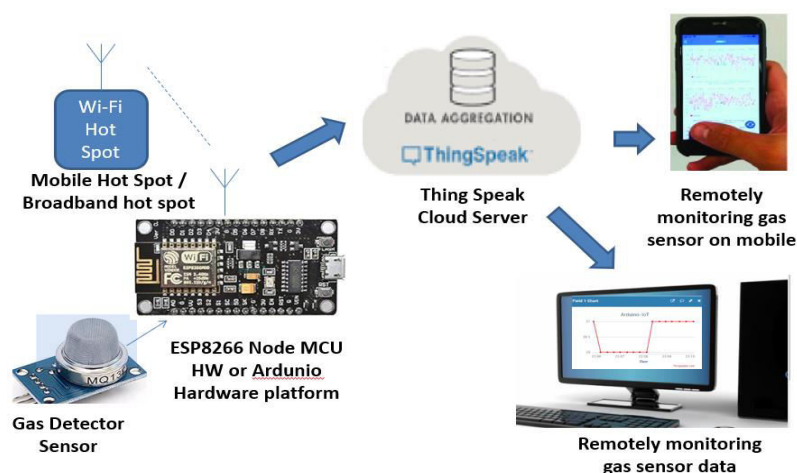
II. RELATED WORK

The concept of an IoT-based gas detection system revolves around leveraging the capabilities of the Internet of Things (IoT) to enhance the monitoring, analysis, and response mechanisms in detecting the presence of gases in various environments. Conventional gas detection methods involve the use of standalone sensors and manual monitoring systems. These include electrochemical sensors, infrared sensors, and catalytic bead sensors. Previous research has explored the integration of gas sensors with IoT technologies to create intelligent systems for real-time monitoring and management. Some studies have explored the use of mobile devices in gas detection, leveraging IoT connectivity to transmit sensor data for remote monitoring. Furthermore, machine learning and analytics have been employed in gas detection systems to improve accuracy and enable predictive capabilities.

The work in this paper is divided in two stages. 1) Gas Detection 2) SMS and alarms. Gas detection is done by MQ2 gas sensors which have capability to sense the harmful gases with help NodeMCU wifi module and send this data to Thingspeak cloud and this cloud will display the detected data in the form of graph. Thereafter,the NodeMCU is further connected to SIM800C SMS module which enables to send the SMS to client.

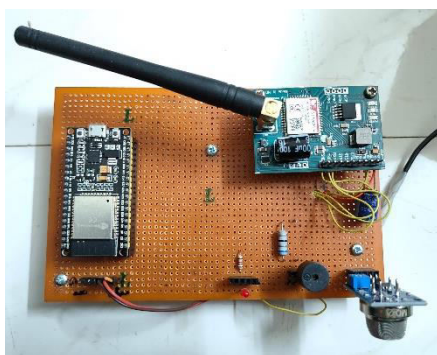
III. METHODOLOGY

The IOT based gas detection system architecture includes hardware components, software components, and communication protocols. The hardware components includes [1]NodeMCU wifi module used for communication between devices and Thingspeak cloud, [2] MQ2 gas sensor for detecting harmful gases,[3]SIM800C for sending SMS to alert clients,[4]Buzzer for alarm feature,[5]LED an alternative way to alert. The software components include Arduino IDE for programming and uploading code to NodeMCU wifi module and Thingspeak cloud for displaying the detected data in the form of graph. Whenever there is gas leakage or smoke in the environment , the sensors in the system quickly detects it and sends this data to cloud and cloud immediately update the graph in 20-25 seconds. Further this data is also received by NodeMCU module which is connected to SIM800C. As NodeMCU module is connected to SIM800C , the SMS module also receives the detected data and sends and SMS to particular clients mobile device number. Due to which client gets the alerts as well as alarm by Buzzer and incident is prevented.

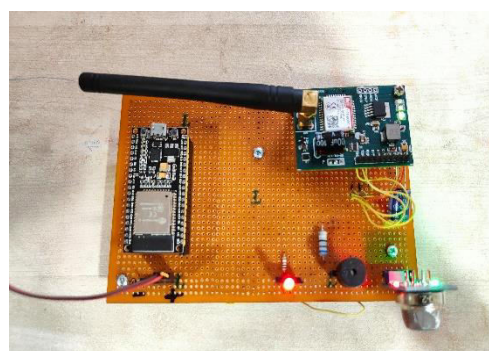


IV. EXPERIMENTAL RESULTS

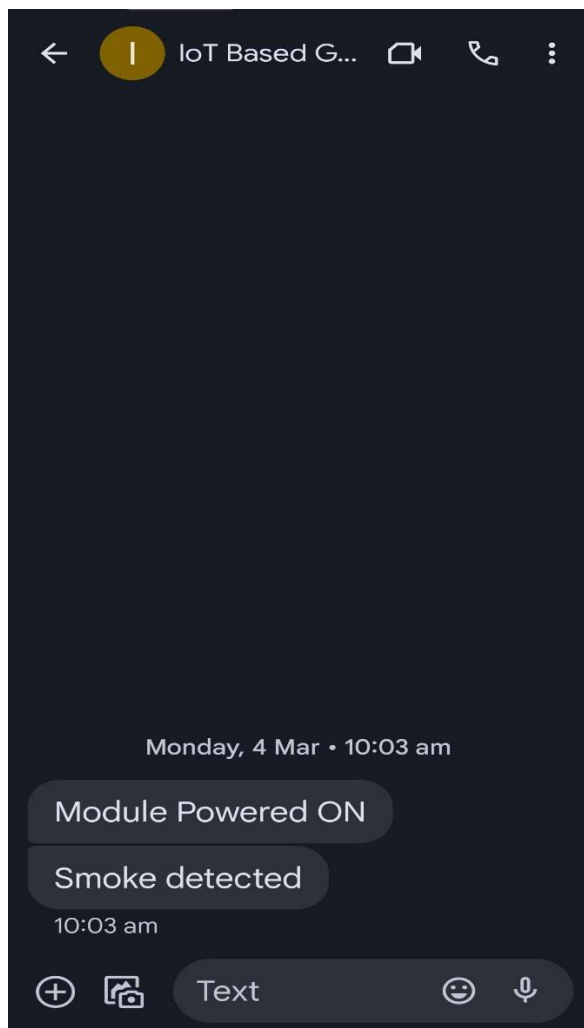
Figures shows the results of IOT based gas detection system. Fig (a) shows the actual circuit diagram (b) shows the circuit after its been executed (c)Shows the SMS received on clients mobile number and (d) shows the updated graph on thingspeak when gas/smoke is detected.



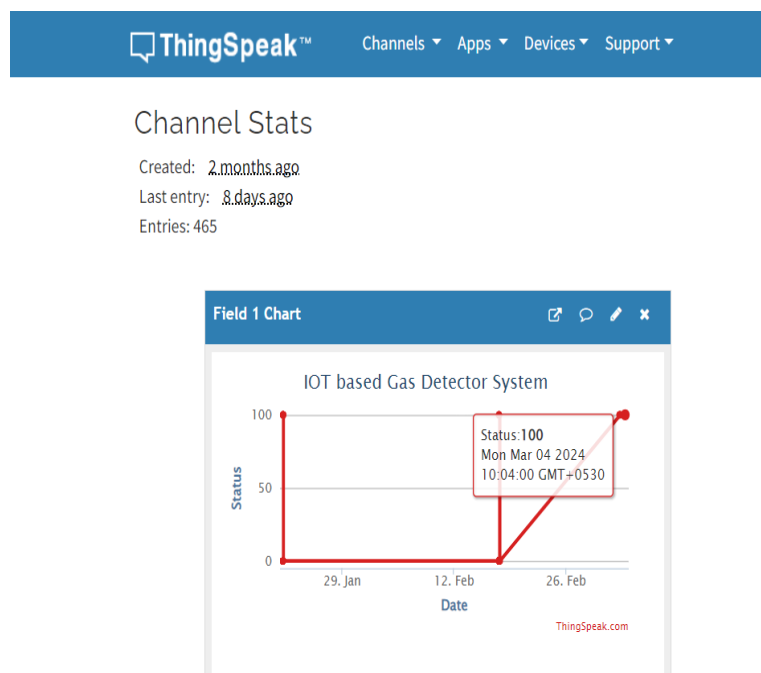
a)



b)



c)



d)

V. CONCLUSION

In conclusion we have implemented an IOT based gas detection system that represents a significant stride towards enhancing safety and responsiveness in various environments. By seamlessly integrating gas sensors with Internet of Things (IoT) technology, this system enables real-time monitoring, remote management, and proactive alerting in the face of potential gas hazards.

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